

# PATENT ABSTRACTS OF JAPAN

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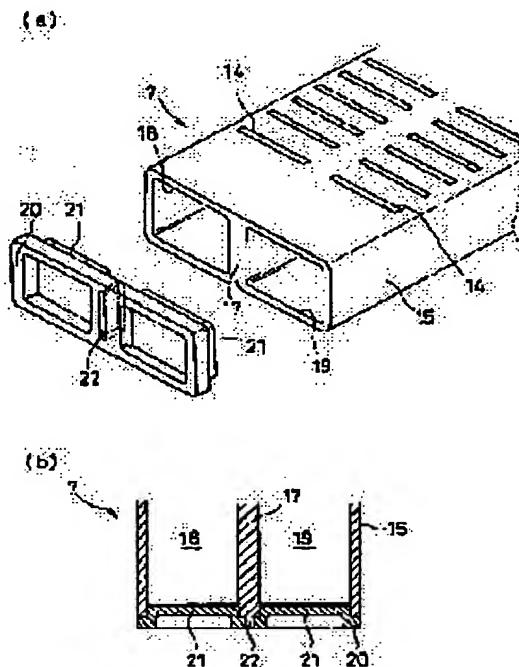
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## (54) HEAT EXCHANGER

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a heat exchange which comprises a tank where a plurality of partitions parallel to each other in the ventilation direction are provided inside with an opening provided on the side in the ventilation direction and detects a bypass leak which means a heat-exchange medium bypasses from one partition to another without travelling a heat exchange medium channel of a tube.

**SOLUTION:** A tank 7 is provided with an opening on the side in ventilation direction of inlet/outlet side parts 18 and 19 partitioned with a diaphragm 17 extending in lamination direction. A slit hole 22 penetrating a closing member 20 is provided, axially in opening of the tank 7, at a part which comes to be between protruding parts 21 and 21 of the closing member 20 when the opening of the tank 7 is closed with the closing member 20.



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**CLAIMS**

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**[Claim(s)]**

[Claim 1] While consisting of a tube which has a heat exchange medium path inside, a fin by which a laminating is carried out by turns [ this / tube and by turns ], and a tank of said tube arranged on one side at least, said tank In the heat exchanger which has two or more drawing rooms as for which the side which met in that ventilation direction carried out opening while standing in a row in the ventilation direction, and blockades opening of this drawing room by the lock out member The heat exchanger characterized by forming a heat exchange medium detection means to make this heat exchange medium flow into the heat exchanger exterior between the drawing room of said tank in the middle of the passage where the heat exchange medium revealed from one drawing room flows to the drawing room of another side, and drawing rooms, or in said lock out member.

[Claim 2] The heat exchanger according to claim 1 characterized by preparing the slit hole which penetrates the lock out member concerned to the shaft orientations of opening of said tank as said heat exchange medium detection means in the part which becomes between opening of said tank of said lock out member, and openings.

[Claim 3] The heat exchanger according to claim 1 characterized by preparing a clearance between \*\*\*\*\* lock out members while blockading each opening of said tank by different lock out member as said heat exchange medium detection means.

[Claim 4] The heat exchanger according to claim 1 characterized by preparing a slot inside the direction of a laminating by making the part which becomes between opening of said tank of said lock out member, and openings project on the outside of the direction of a laminating as said heat exchange medium detection means.

[Claim 5] The heat exchanger according to claim 1 characterized by having hollowed the part between the drawing room of said tank, and a drawing room inside the direction of a laminating, and preparing a slot as said heat exchange medium detection means.

[Claim 6] While consisting of a tube which has a heat exchange medium path inside, a fin by which a laminating is carried out by turns [ this / tube and by turns ], and a tank of said tube arranged on one side at least, said tank The heat exchanger characterized by preparing opening which carried out opening in the direction of a path to this drawing room in the heat exchanger which has two or more drawing rooms as for which the side which met in that ventilation direction carried out opening near the opening of the peripheral surface of said drawing room while standing in a row in the ventilation direction, and fitting a lock out member in this opening.

[Claim 7] The heat exchanger according to claim 1, 2, 3, 4, or 5 characterized by arranging independently the tank which makes possible the clinch of the heat exchange medium from a heat exchange medium path to other drawing rooms and the heat exchange medium path open for free passage which is open for free passage with the drawing room of 1 in the opposite side the side on which said tank of said tube was arranged.

[Claim 8] Said tank is a heat exchanger according to claim 1, 2, 3, 4, 5, or 6 characterized by being formed in one of extrusion molding.

[Claim 9] The heat exchanger according to claim 1, 2, 3, 4, 5, or 6 characterized by being arranged so that this volume bundle section may serve as the upstream of the ventilation

direction when it winds around the side to which said tube met in the direction of a short hand and has the bundle section.

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

#### [0001]

[Field of the Invention] This invention is a heat exchanger used for the air conditioner for cars etc., and the tank which has at least two or more drawing rooms of a tube installed in the edge side by side in the ventilation direction on the other hand is arranged.

#### [0002]

[Description of the Prior Art] While carrying out two or more step laminating of the tube and fin with which a heat exchange medium flows by turns The side which was equipped with the tank of this tube joined so that it might be open for free passage with the tube concerned at an edge on the other hand at least, and was divided into two or more \*\* to which the interior of this tank extends in the direction of a tube laminating, and met in the ventilation direction of each \*\* carries out opening. As a heat exchanger blockaded by fitting in the height formed in the cap, everything but JP,10-19490,A recognizes a large number existence of this opening.

#### [0003]

[Problem(s) to be Solved by the Invention] however, in blockading with a cap the tank with which such the interior is divided into two or more \*\* prolonged in the direction of a tube laminating If poor soldering is between the septa 102 and the Tanggu sides of the lock out member 103 into which the drawing room 100 and the drawing room 101 are divided as shown in drawing 8 It curses with a septum 102 and the lock out member 103, and through a defect part, a heat exchange medium bypasses like the arrow head on drawing 8 in the drawing room 101 from the drawing room 100, and there is a possibility of producing the fault that the heat exchange capacity of a heat exchanger decreases by this. Since this leakage in a bypass has a lock out member and could not be viewed, it had brought a result to which the low heat exchanger of heat exchange capacity circulates in a commercial scene in the present condition.

[0004] Then, while this invention has two or more drawing rooms, when using the tank which closed opening of this drawing room by the lock out member, it aims at offering the heat exchanger which can detect the leakage in a bypass bypassed from the drawing room of 1, without other a heat exchange medium drawing minding the heat exchange medium path of a tube.

#### [0005]

[Means for Solving the Problem] While the heat exchanger which carries out a deer and starts this invention consists of a tube which has a heat exchange medium path inside, a fin by which a laminating is carried out by turns [ this / tube and by turns ], and a tank of said tube arranged on one side at least In the heat exchanger which has two or more drawing rooms as for which the side which met in that ventilation direction carried out opening while said tank is arranged in parallel in the ventilation direction, and blockades opening of this drawing room by the lock out member It is characterized by forming a heat exchange medium detection means to make this heat exchange medium flow into the heat exchanger exterior between the drawing room of said tank in the middle of the passage where the heat exchange medium revealed from one drawing room flows to the drawing room of another side, and drawing rooms, or in said lock out member (claim 1). If this configuration is shown more concretely, it is what prepared the slit hole which

penetrates the lock out member concerned to the shaft orientations of opening of said tank as said heat exchange medium detection means in the part which becomes between opening of said tank of said lock out member, and openings (claim 2). Moreover, while blockading each opening of said tank by different lock out member as said heat exchange medium detection means, it is what prepared the clearance between \*\*\*\*\* lock out members (claim 3). Furthermore, it is what prepared the slot inside the direction of a laminating by making the part which becomes between opening of said tank of said lock out member, and openings project on the outside of the direction of a laminating as said heat exchange medium detection means (claim 4). Furthermore, it is what the part between the drawing room of said tank and a drawing room was hollowed inside the direction of a laminating, and prepared the slot as said heat exchange medium detection means again (claim 5).

[0006] Even if according to the configuration of such a heat exchanger poor soldering arises between the drawing room of 1, and the Tanggu side of a lock out member, a heat exchange medium is revealed from this drawing room and it goes to other drawing room side The heat exchange medium detection means established in the middle of the passage of this heat exchange medium (since it flows out of the slit hole of a lock out member, a slot, the clearance between lock out members, or the slot between the drawing rooms of a tank out of a heat exchanger, specifically) Since it becomes possible to check leakage of a heat exchange medium in advance by trial etc., it can prevent that a heat exchanger with such a defect flows into a commercial scene.

[0007] On the other hand, while consisting of a tube which has a heat exchange medium path inside, a fin by which a laminating is carried out by turns [ this / tube and by turns ], and a tank of said tube arranged on one side at least Said tank is good also as that by which the side which met in that ventilation direction prepares opening which carried out opening in the direction of a path to this drawing room in the heat exchanger which has two or more drawing rooms which carried out opening near the opening of the peripheral surface of said drawing room, and fits a lock out member in this opening while it is arranged in parallel in the ventilation direction (claim 6).

[0008] Since a heat exchange medium flows out of the opening side of a drawing room into the heat exchanger exterior and it becomes possible to check leakage of a heat exchange medium in advance by trial etc. when poor soldering arises between the drawing room of 1, and the Tanggu side of a lock out member by considering as the configuration of such a heat exchanger, it can prevent that a heat exchanger with such a defect flows into a commercial scene.

[0009] On the other hand, although this heat exchanger may be a piece tank mold which has a tank only in one side of a tube, it is good for the side on which said tank of said tube was arranged, and the opposite side also as both (claim 7) tank mold that arranged independently the tank which makes possible the clinch of the heat exchange medium to the drawing room of 1, the drawing room of a heat exchange medium path open for free passage to others, and a heat exchange medium path open for free passage. And in equipping the both ends of a tube with a tank, said tank may be made to be formed of extrusion molding in one in this way (claim 8). Since the septum with which this divides a drawing room and a drawing room in the ventilation direction also in the interior of the tank which has two or more drawing rooms is formed in one, a heat exchange medium does not bypass directly at the drawing room of 1, and other drawing rooms.

[0010] And when said tube winds and it has the bundle section, it is good also as what was arranged so that this volume bundle section might serve as the upstream of the ventilation direction (claim 9). By considering as arrangement of such a tube, the corrosion resistance over the corrosion which the contaminant flown from the windward adheres and is produced since the upstream of a tube becomes thick by this volume bundle section can be raised, and it becomes possible to lengthen the life of a tube.

[0011]

[Embodiment of the Invention] Hereafter, a drawing explains the gestalt of implementation of this invention.

[0012] The heat exchanger 1 shown in drawing 1 and drawing 2 For example, the tubes 2 and 3

which are the laminating mold evaporators of both the tank mold used for a car, and were installed in the ventilation direction, The corrugated fin 4 by which two or more step laminating was carried out by turns [ this / tubes 2 and 3 and by turns ], The end plates 5 and 5 arranged on the both sides of the direction of a laminating, the tank 6 formed in the longitudinal direction end of said tubes 2 and 3, and this tank 6 are the things of the two pass method which consisted of tanks 7 formed in the end of the opposite side.

[0013] Among these, as tubes 2 and 3 are shown in drawing 2, the brazing sheet of one sheet is bent to two or more steps by the roll homing or press working of sheet metal, and, on the other hand, another side one end of the ventilation direction has one heat exchange medium path 12 by [ of the ventilation direction ] considering as the volume bundle section 11 by making one end into a bend 10. The part near the opening of the heat exchange medium path 12 serves as the tank insertion section 13 connectable with the tube connection hole 14 in which tanks 6 and 7 carry out the following. In addition, although it does not illustrate in the heat exchange medium path 12 in order to improve the stirring nature of a heat exchange medium, you may make it form two or more beads inside the field which becomes [ as opposed to / as a configuration in which an inner fin is stored / the ventilation direction ] perpendicular.

[0014] And in case said tubes 2 and 3 are installed in the ventilation direction, it is arranged so that the volume bundle section 11 may serve as the ventilation direction upstream of each tubes 2 and 3. Thus, the corrosion resistance over the corrosion which the contaminant flown from the windward adheres and is produced since the upstream of tubes 2 and 3 becomes thick by this volume bundle section 11 can be raised by installing tubes 2 and 3 so that the volume bundle section 11 may serve as the upstream, and it becomes possible to lengthen the life of tubes 2 and 3.

[0015] On the other hand, as a tank 6 and a tank 7 are shown in drawing 1, it consisted of the lock out members 16 or the lock out members 20 which carry out the following to the tube-like object 15 made from an aluminium alloy with which the tube connection hole 14 for connecting with said tubes 2 and 3 was formed, and a tube-like object 15 is formed of extrusion molding. It is lost that a heat exchange medium is revealed from the clearance between the Tanggu sections by poor junction of a deep-drawing tank member and a lock out member like the conventional tank which becomes by such configuration by the deep-drawing tank member of the shape of \*\*\*\* in which one side carried out opening, and the lock out member which blockades this opening.

[0016] And a tank 6 is a lock out \*\*\*\* thing in fitting in the height (not shown) of the lock out member 16 for opening of both sides into a tube-like object 15, and is the cuff tank which makes the clinch of a heat exchange medium possible.

[0017] A tank 7 is completely separated into two inlet-port flanks 18 and the outlet side section 19 from the septum 17 prolonged along with the longitudinal direction of a tube 10 in the center of the interior of a tube-like object 15. Although it is not blockaded by fitting in into a tube-like object 15 and the height 21 of the lock out member 20 is not illustrated, an entrance-side pipe is connected [ flank / 18 / inlet-port ], an outlet side pipe is connected [ section / 19 / outlet side ], and opening of both sides serves as an entrance tank. The septum 17 of this tank 3 is formed of extrusion molding, a heat exchange medium bypasses [ a septum ] directly in an inlet-port flank and the outlet side section from that clearance by poor junction with tank inner skin by another member by this, and the engine performance of a heat exchanger does not deteriorate.

[0018] In addition, on the relation put on the condition that water always adheres in using a heat exchanger 1 as an evaporator, by the approach of forming the layer which contained zinc on the front face where zinc (Zn) is extruded by the approach or bilayer extrusion which carries out thermal spraying later etc., a sacrifice layer is formed and corrosion resistance is raised in the front face of tanks 6 and 7.

[0019] By the way, although it has two heights 21 and 21 since the both sides of the inlet-port flank 18 and the outlet side section 19 are blockaded as the lock out member 20 which blockades opening of the tubed part material 15 of a tank 7 is shown in drawing 3 The slit hole 22 which penetrates the lock out member 20 concerned to the shaft orientations of the entrance

flanks 18 and 19 is formed in the part which stands face to face against the end face of a septum 17 which divides into between this height 21 and height 21 (i.e., the inlet-port flank 18 and the outlet side section 19) as a detection means of the revealed heat exchange medium.

[0020] Even if poor soldering arises between the inner skin of the lock out member 20, the tubed part material 15, especially a septum 17, for example, a heat exchange medium is transmitted in said poor soldering part and revealed from the inlet-port flank 18 by considering as such a configuration Since this revealed heat exchange medium flows caudad and falls and flows out through the slit hole 22 of the lock out member 20 which consists between the inlet-port flank 18 and the outlet side section 19 before it arrives at the outlet side section 19, it can discover simply the heat exchanger which produced above-mentioned poor soldering.

[0021] Moreover, as shown in drawing 4, when the lock out member 20 shall be constituted from two lock out members 20a and 20a and these lock out members 20a and 20a fit a height 21 in opening of the inlet-port flank 18 or the outlet side section 19 instead of the slit hole 22 as a heat exchange medium detection means of the lock out member 20, it is good also as a thing with a predetermined clearance.

[0022] Even if poor soldering arises between the inner skin of the lock out members 20a and 20a, the tubed part material 15, especially a septum 17, for example, a heat exchange medium is transmitted in said poor soldering part and revealed from the inlet-port flank 18 by considering as such a configuration Since this revealed heat exchange medium flows caudad and falls and flows out of the clearance between lock out member 20a which consists between the inlet-port flank 18 and the outlet side section 19, and 20a before it arrives at the outlet side section 19, it can discover simply the heat exchanger which produced above-mentioned poor soldering.

[0023] furthermore, as a heat exchange medium detection means of the lock out member 20 As shown in drawing 5, instead of the slit hole 22 Between this height 21 and height 21, That is, you may make it form a slot 24 inside [ direction of laminating ] this lobe 23 by forming a lobe 23 by making the outside of the direction of a laminating bend the part which stands face to face against the end face of a septum 17 which divides into the inlet-port flank 18 and the outlet side section 19.

[0024] Even if poor soldering arises between the inner skin of the lock out member 20, the tubed part material 15, especially a septum 17, for example, a heat exchange medium is transmitted in said poor soldering part and revealed from the inlet-port flank 18 by considering as such a configuration Since this revealed heat exchange medium flows caudad and falls and flows out through the slot 24 of the lock out member 20 which consists between the inlet-port flank 18 and the outlet side section 19 before it arrives at the outlet side section 19, it can discover simply the heat exchanger which produced above-mentioned poor soldering.

[0025] Furthermore, you may make it form the slot 25 which the shaft orientations of the entrance flanks 18 and 19 concerned were hollowed, and carried out opening of the opening side edge section of the entrance flanks 18 and 19 caudad at least among the septa 17 of the tubed part material 15 again, as shown in drawing 6 instead of forming a heat exchange medium exclusion means in the lock out member 20.

[0026] Even if poor soldering arises between the inner skin of the lock out member 20, the tubed part material 15, especially a septum 17, for example, a heat exchange medium is transmitted in said poor soldering part and revealed from the inlet-port flank 18 by considering as such a configuration Since this revealed heat exchange medium flows caudad and falls and flows out of the slot 25 of the tubed part material 15 which consists between the inlet-port flank 18 and the outlet side section 19 before it arrives at the outlet side section 19, it can discover simply the heat exchanger which produced above-mentioned poor soldering.

[0027] On the other hand, in drawing 7, the long and slender long holes 26 and 26 which have a dimension equal to the ventilation direction width of face of the inlet-port flank 18 and the outlet side section 19 are formed in the top face near the opening of the tubed part material 15, and it has composition which fits sheet metal-like lock out member 20b in this long hole 26.

[0028] Since a heat exchange medium flows out and is detected from the opening side of a drawing room to the heat exchanger exterior even if poor soldering arises by considering as such a configuration between the peripheral surface of the tubed part material 15, and the lock out

member 20, the heat exchanger which produced above-mentioned poor soldering can be discovered simply.

[0029]

[Effect of the Invention] As stated above, even if according to invention indicated by claims 1-5 poor soldering arises between the drawing room of 1, and the Tanggu side of a lock out member, a heat exchange medium is revealed from this drawing room and it goes to other drawing room side Since it flows out of a heat exchange medium detection means out of a heat exchanger and becomes possible to check leakage of a heat exchange medium in advance by trial etc., it can prevent that a heat exchanger with such a defect flows into a commercial scene.

[0030] On the other hand, since according to invention indicated by claim 6 a heat exchange medium flows out of the opening side of a drawing room into the heat exchanger exterior and it becomes possible to check leakage of a heat exchange medium in advance by trial etc. even if poor soldering arises between the drawing room of 1, and the Tanggu side of a lock out member, it can prevent that a heat exchanger with such a defect flows into a commercial scene.

[0031] Moreover, since the septum with which a drawing room and a drawing room are divided in the ventilation direction also in the interior of the tank which has two or more drawing rooms is formed in one according to invention indicated by claim 7 and claim 8, a heat exchange medium does not bypass directly at the drawing room of 1, and other drawing rooms.

[0032] And since the upstream of a tube becomes thick by this volume bundle section by arranging so that the volume bundle section of a tube may serve as the upstream of the ventilation direction according to invention indicated by claim 9, the contaminant flown from the windward can raise the corrosion resistance over the corrosion adhered and produced, and becomes possible [ lengthening the life of a tube ].

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**DESCRIPTION OF DRAWINGS**

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**[Brief Description of the Drawings]**

[Drawing 1] drawing 1 shows the configuration of the heat exchanger concerning this invention – it is a notching Fig. a part.

[Drawing 2] Drawing 2 is the perspective view showing arrangement of the tube of a heat exchanger same as the above, and a fin.

[Drawing 3] Drawing 3 is an explanatory view about the configuration which prepared the slit hole in the lock out member as a means to detect the heat exchange medium which this invention revealed, drawing 3 (a) is drawing showing the configuration of the lock out member near the opening of this tubed part material, and drawing 3 (b) is the sectional view showing the condition of having fitted the lock out member in tubed part material.

[Drawing 4] Drawing 4 is an explanatory view about the configuration which prepared the clearance among two or more lock out members as a means to detect the heat exchange medium which this invention revealed, drawing 4 (a) is drawing showing the lock out member near the opening of tubed part material, and drawing 4 (b) is the sectional view showing the condition of having fitted the lock out member in tubed part material.

[Drawing 5] Drawing 5 is an explanatory view about the configuration which established the slot in the lock out member as a means to detect the heat exchange medium which this invention revealed, drawing 5 (a) is drawing showing the configuration of the lock out member near the opening of this tubed part material, and drawing 5 (b) is the sectional view showing the condition of having fitted the lock out member in tubed part material.

[Drawing 6] Drawing 6 is an explanatory view about the configuration which established the slot in tubed part material as a means to detect the heat exchange medium which this invention revealed, drawing 6 (a) is drawing showing the configuration of the lock out member near the opening of tubed part material, and drawing 6 (b) is the sectional view showing the condition of having fitted the lock out member in tubed part material.

[Drawing 7] Drawing 7 is an explanatory view about the configuration which fits in a lock out member from the top face of tubed part material as a means to detect the heat exchange medium which this invention revealed, drawing 7 (a) is drawing showing the lock out member near the opening of tubed part material, and drawing 7 (b) is the sectional view showing the condition of having fitted the lock out member in tubed part material.

[Drawing 8] Drawing 8 is the conventional example Fig. having shown the structure to which a heat exchange medium bypasses side opening of the conventional tank body through the clearance between a lock out member and a septum in the drawing room of another side from one drawing room at the time of blockading by the lock out member.

**[Description of Notations]**

- 1 Heat Exchanger
- 2 Tube
- 3 Tube
- 4 Fin
- 6 Tank
- 7 Tank

- 11 Volume Bundle Section
- 17 Septum
- 18 Inlet-Port Flank (Drawing Room)
- 19 Outlet Side Section (Drawing Room)
- 20 (20a, 20b) Lock out member
- 22 Slit Hole
- 23 Lobe
- 24 Slot
- 25 Slot
- 26 Long Hole (Opening)

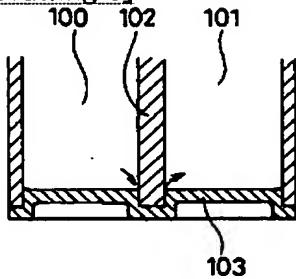
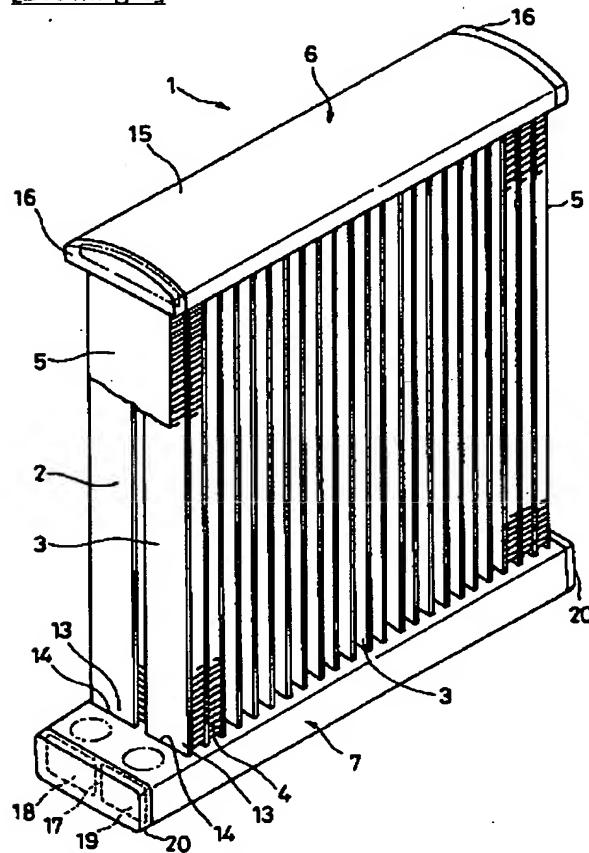
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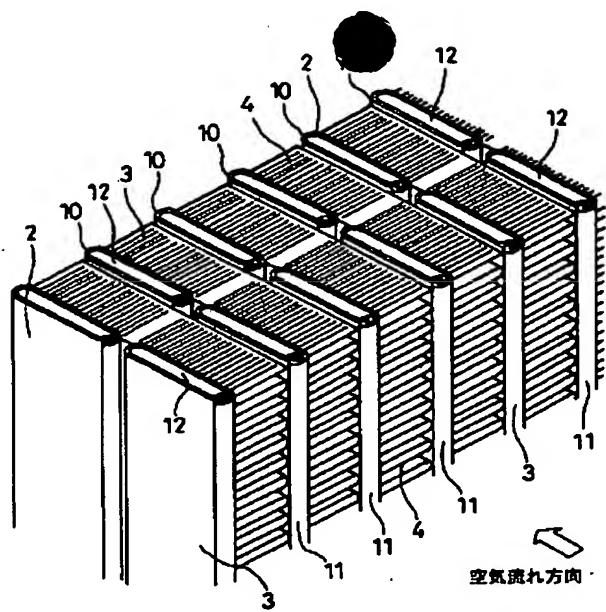
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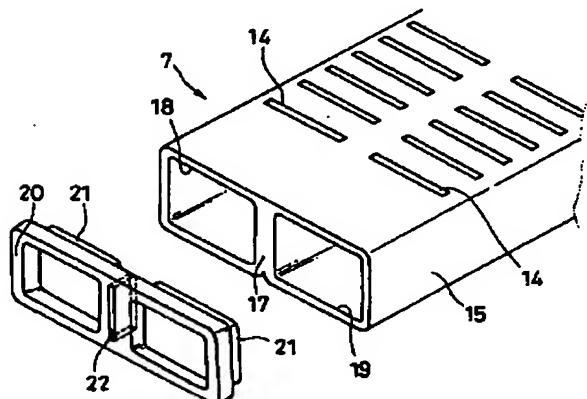
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**DRAWINGS****[Drawing 8]****[Drawing 1]****[Drawing 2]**

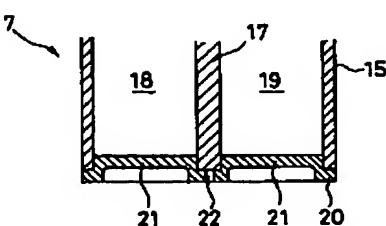


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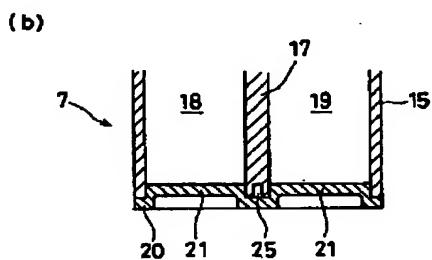
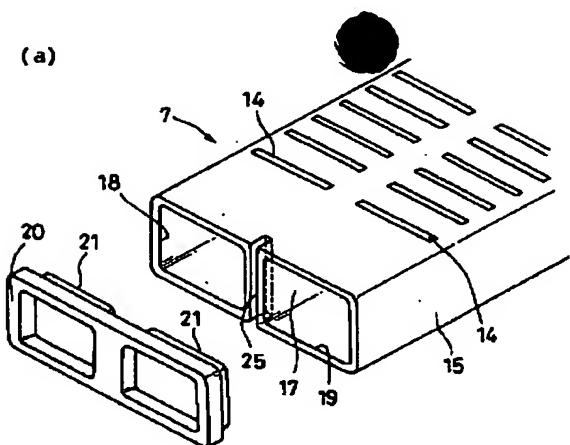
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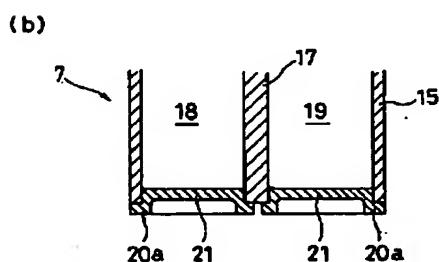
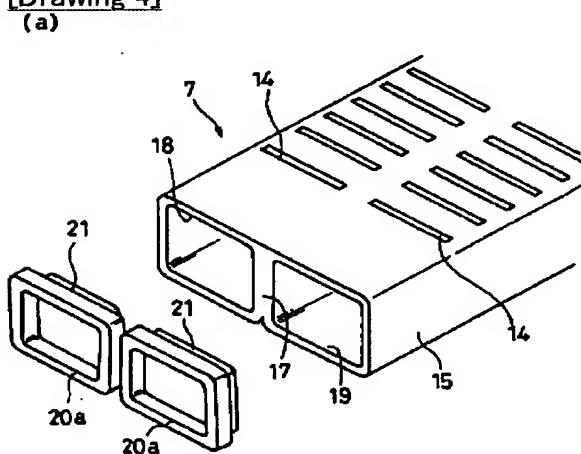
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[Drawing 6]

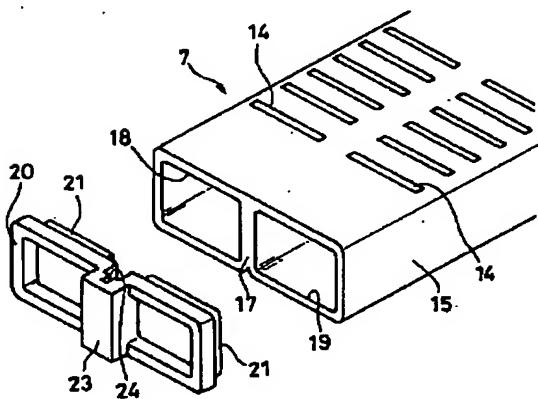


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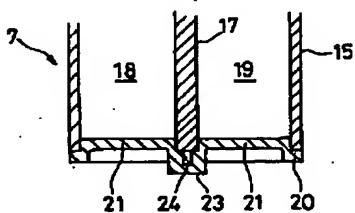


[Drawing 5]

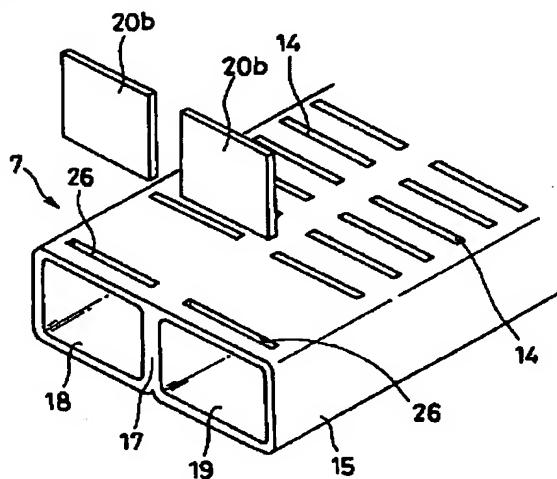
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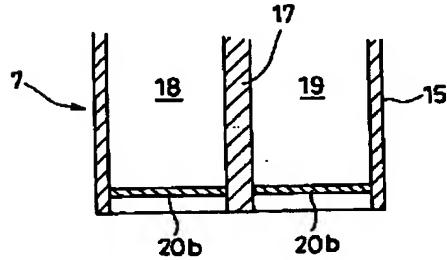
(b)

[Drawing 7]

(a)



(b)



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